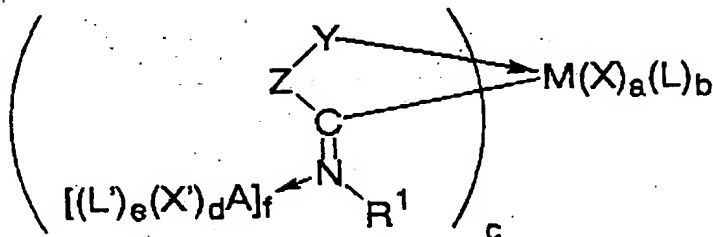
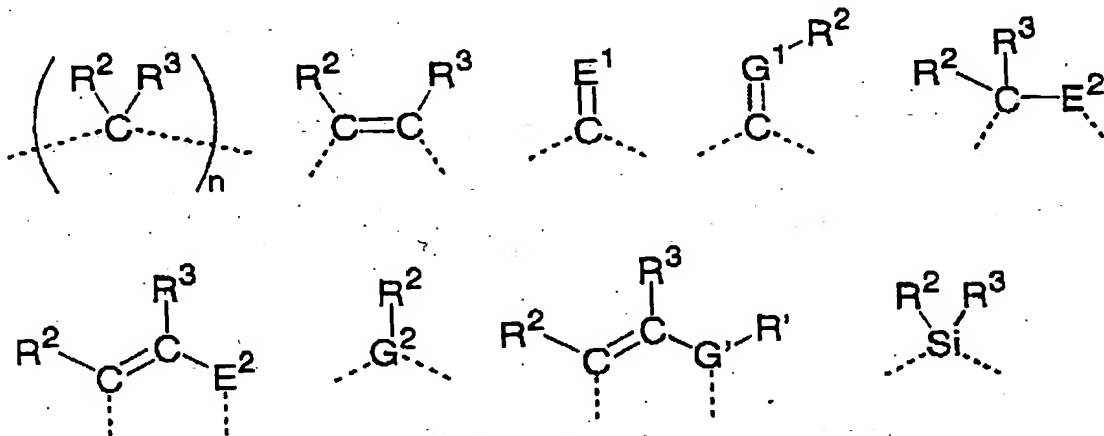


1. A transition metal compound represented by the following general formula (1):



Z represents a substituent selected from the group consisting of substituents represented by the following formulae (2):



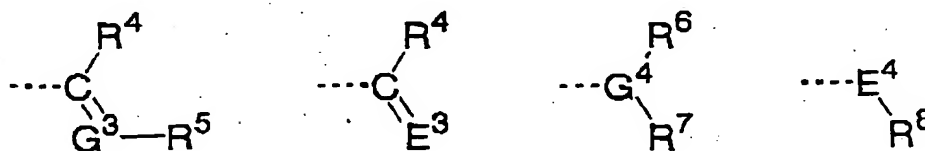
wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> independently represents a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarb n group

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 Related Case Serial No: 10/094799  
 Related Case Filing Date: 03/12/02

containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom,  $R^1$ ,  $R^2$  and  $R^3$  may be the same or different, and two members selected from  $R^1$ ,  $R^2$  and  $R^3$  may be bonded together to form a ring, provided that at least two rings can be formed;  $E^1$  and  $E^2$  represent an atom of group 16 of the periodic table,  $G^1$ ,  $G^2$  and  $G^3$  represent an atom of group 15 of the periodic table,  $n$  is an integer of 0 to 2 provided that a case when  $n$  is 0 means that  $Y$  and the iminoacyl group in formula (1) are directly bonded to each other;

$Y$  represents a substituent selected from the group consisting of substituents represented by the following formulae (3):



wherein  $R^4$ ,  $R^7$  and  $R^8$  independently represents a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom,  $R^5$  represents a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom,  $R^6$  represents a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom,  $E^3$  and  $E^4$  represent an atom of group 16 of the periodic table,  $G^3$  and  $G^4$  represent an atom of group 15 of the periodic table,  $R^4$  and  $R^5$  may be bonded together to form a ring, and  $R^6$  and  $R^7$

may be bonded together to form a ring;

two members selected from  $R^1$ , Z and Y may be bonded together to form a ring, provided that at least two rings can be formed;

A represents a transition metal atom of groups 3 to 11 of the periodic table or a typical element of groups 1, 2 and 11 to 16 of the periodic table;

X' represents a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, a hydrocarbon group containing a substituted silyl group, or a hydrocarbon group containing an atom of group 15 or group 16 of the periodic table or a halogen atom, or X' is a halogen atom; and d is an integer of 0 to 6 and, when n is at least 2, X's may be the same or different;

L' is a coordinate bond-forming compound having a coordinating member selected from the group consisting of  $\pi$  electron, atoms of groups 14, 15 and 16 of the periodic table and halogen atoms, and e is an integer of 0 to 6 and, when e is at least 2, L's may be the same or different;

d is an oxidation number of the central metal A, and f is an integer of 0 or 1;

M represents a transition metal atom of groups 3 to 11 of the periodic table;

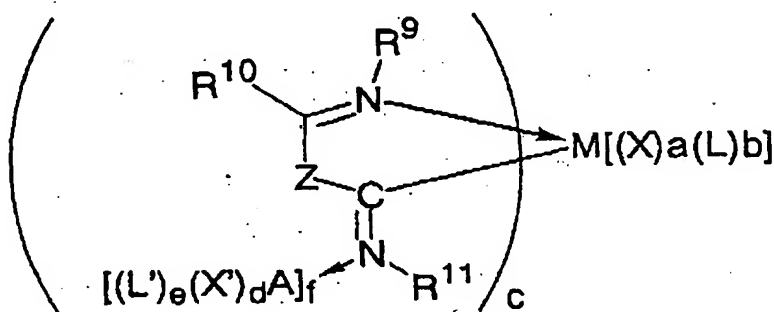
X represents a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, a hydrocarbon group containing a substituted silyl group, or a hydrocarbon group containing an atom of group 15 or group 16 of the periodic table or a halogen atom, or X is a halogen atom; and a is an integer of 1 to 5 and, when a is at least 2, Xs may be the same or different;

L is a coordinate bond-forming compound having a coordinating member selected from the group consisting of  $\pi$  electron, atoms of groups 14, 15 and 16 of the periodic table and halogen atoms, and b is an integer of 0 to 6 and, when b is

at least 2, Ls may be the same or different; and X and L may be bonded to each other, L and R<sup>1</sup> may be bonded to each other, and L and Y may be bonded to each other; and

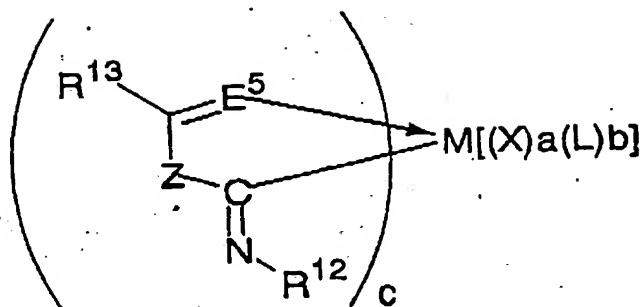
c is an integer of 1 to 5 and the sum of a + c is an oxidation number of the central metal M.

2. A transition metal compound represented by the following general formula (4):



wherein R<sup>9</sup> and R<sup>11</sup> represent a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom; R<sup>10</sup> represents a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom; Z, M, X, L, A, X', L', a, b, c, d, e and f are the same as Z, M, X, L, A, X', L', a, b, c, d, e and f, which are defined for formula (1); two members selected from R<sup>9</sup>, R<sup>10</sup>, R<sup>11</sup> and Z may be bonded to each other to form a ring, provided that at least two rings can be formed, X and L may be bonded to each other, L and R<sup>9</sup> may be bonded to each other, and L and R<sup>11</sup> may be bonded to each other.

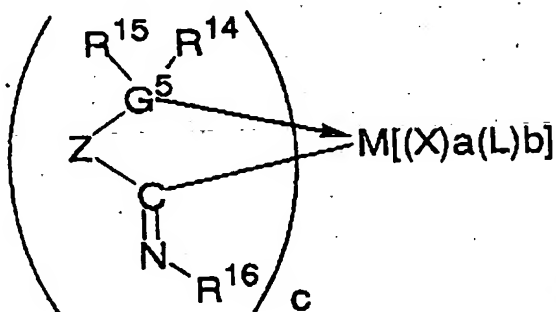
3. A transition metal compound represented by the following general formula (5):



wherein  $R^{12}$  represents a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom;  $R^{13}$  represents a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom;

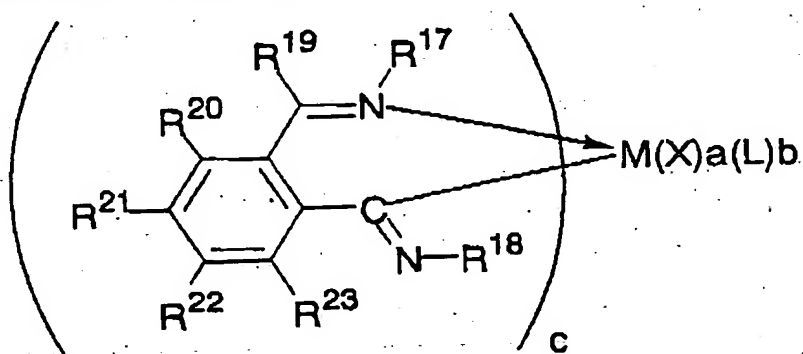
$E^5$  represents an atom of group 16 of the periodic table; Z, M, X, L, a, b and c are the same as Z, M, X, L, a, b and c, respectively, which are defined for formula (1); two members selected from  $R^{12}$ ,  $R^{13}$  and Z may be bonded to each other to form a ring, provided that at least two rings can be formed; X and L may be bonded to each other, and L and  $R^{12}$  may be bonded to each other.

4. A transition metal compound represented by the following general formula (6):



wherein  $R^{14}$  and  $R^{15}$  represent a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom,  $R^{14}$  and  $R^{15}$  may be the same or different, and  $R^{14}$  and  $R^{15}$  may be bonded together to form a ring;  $R^{16}$  represents a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom;  $G^5$  represents an atom of group 15 of the periodic table;  $Z$ ,  $M$ ,  $X$ ,  $L$ ,  $a$ ,  $b$  and  $c$  are the same as  $Z$ ,  $M$ ,  $X$ ,  $L$ ,  $a$ ,  $b$  and  $c$ , respectively, which are defined for formula (1); two members selected from  $R^{14}$ ,  $R^{15}$ ,  $R^{16}$  and  $Z$  may be bonded together to form a ring, provided that at least two rings can be formed;  $X$  and  $L$  may be bonded to each other,  $L$  and  $R^{14}$  may be bonded to each other,  $L$  and  $R^{15}$  may be bonded to each other, and  $L$  and  $R^{16}$  may be bonded to each other.

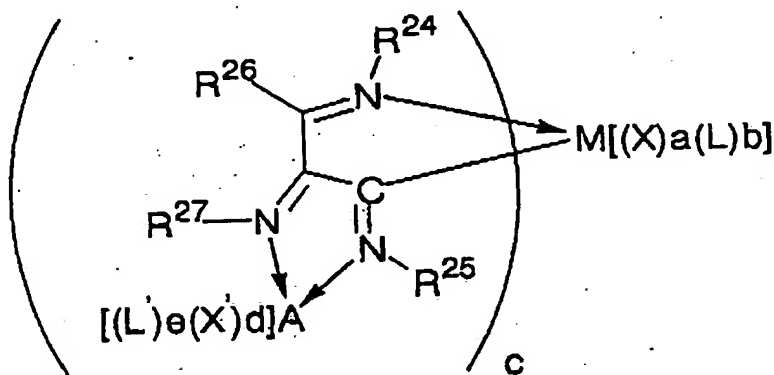
5. A transition metal compound represented by the following general formula (7):



wherein  $R^{17}$  and  $R^{18}$  represent a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a

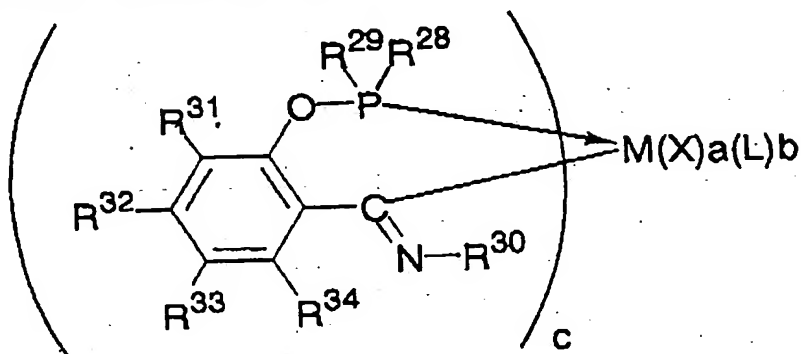
substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom, and  $R^{17}$  and  $R^{18}$  may be the same or different;  $R^{19}$  through  $R^{23}$  represent a hydrogen atom, a halogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom,  $R^{19}$  through  $R^{23}$  may be the same or different, and two members selected from  $R^{17}$  through  $R^{23}$  may be bonded together to form a ring, provided that at least two rings can be formed; M, X, L, a, b and c are the same as M, X, L, a, b and c, respectively, which are defined for formula (1); and X and L may be bonded to each other, L and  $R^{17}$  may be bonded to each other, and L and  $R^{18}$  may be bonded to each other.

6. A transition metal compound represented by the following general formula (8):



wherein  $R^{24}$  through  $R^{27}$  represent a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom; and M, X, L, A, X', L', a, b, c, d and e are the same as M, X, L, A, X', L', a, b, c, d and e, respectively, which are defined for formula (1).

7. A transition metal compound represented by the following general formula (9):

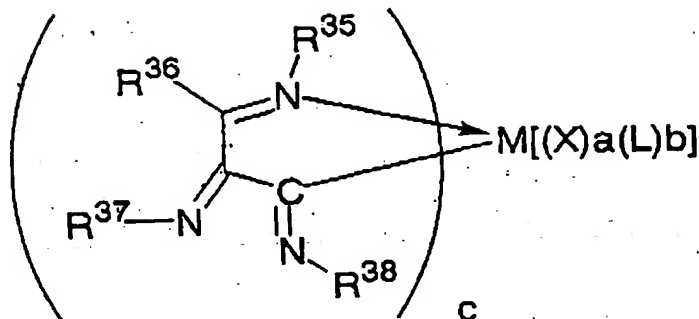


wherein  $R^{28}$ ,  $R^{29}$  and  $R^{31}$  through  $R^{34}$  represent a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a substituent containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom;  $R^{30}$  represents a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom,  $M$ ,  $X$ ,  $L$ ,  $a$ ,  $b$  and  $c$  are the same as  $M$ ,  $X$ ,  $L$ ,  $a$ ,  $b$  and  $c$ , respectively, which are defined for formula (1); and  $X$  and  $L$  may be bonded to each other,  $L$  and  $R^{28}$  may be bonded to each other,  $L$  and  $R^{29}$  may be bonded to each other, and  $L$  and  $R^{30}$  may be bonded to each other.

8. A catalyst for polymerization of an olefin, which comprises (A) a transition metal compound as claimed in any one of claims 1 to 7, and (B) an activating cocatalyst.

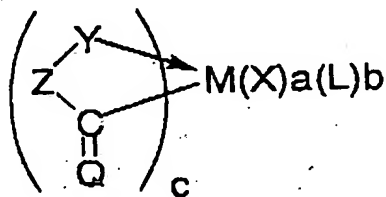
9. A catalyst for polymerization of an olefin, which comprises (A) a transition metal compound and (B) an activating cocatalyst; said transition metal compound (A) being represented by the following general formula (10):





wherein  $R^{35}$  through  $R^{38}$  represent a hydrogen atom, a hydrocarbon group having 1 to 30 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom; and M, X, L, a, b and c are the same as M, X, L, a, b and c, respectively, which are defined for formula (1).

10. A catalyst for polymerization of an olefin, which comprises (A) a transition metal compound and (B) an activating cocatalyst; said transition metal compound (A) being represented by the following general formula (11):

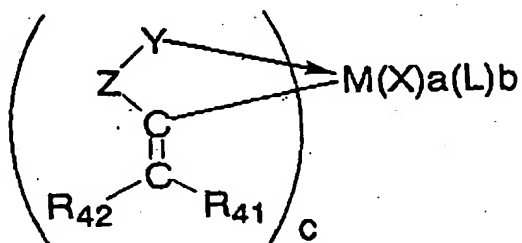


wherein Q represents an element of group 16 of the periodic table or  $C(R^{39})(R^{40})$  wherein  $R^{39}$  and  $R^{40}$  represent a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom;

Z, Y, M, X, L, a, b and c are the same as Z, Y, M, X, L,

a, b and c, respectively, which are defined for formula (1); and two members selected from Q, Z and Y may be bonded together to form a ring, provided that at least two rings can be formed; X and L may be bonded to each other, and L and Y may be bonded to each other.

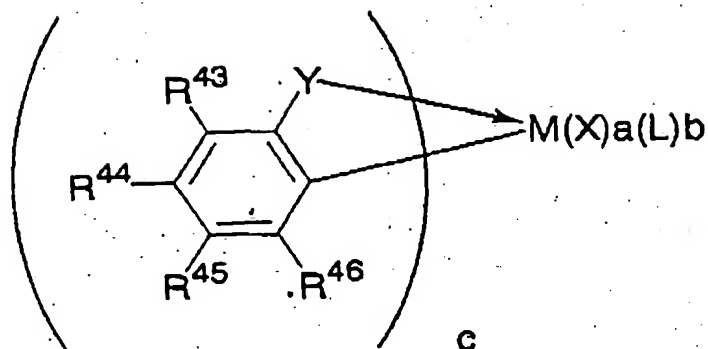
11. A catalyst for polymerization of an olefin, which comprises (A) a transition metal compound and (B) an activating cocatalyst; said transition metal compound (A) being represented by the following general formula (12):



wherein  $\text{R}^{41}$  and  $\text{R}^{42}$  represent a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, or a hydrocarbon group containing a substituted silyl group, an atom of group 15 or group 16 of the periodic table or a halogen atom, and  $\text{R}^{41}$  and  $\text{R}^{42}$  may be the same or different;

Z, Y, M, X, L, a, b and c are the same as Z, Y, M, X, L, a, b and c, respectively, which are defined for formula (1); and two members selected from  $\text{R}^{41}$ ,  $\text{R}^{42}$ , Z and Y may be bonded together to form a ring, provided that at least two rings can be formed; X and L may be bonded to each other, L and  $\text{R}^{41}$  may be bonded to each other, L and  $\text{R}^{42}$  may be bonded to each other, and L and Y may be bonded to each other.

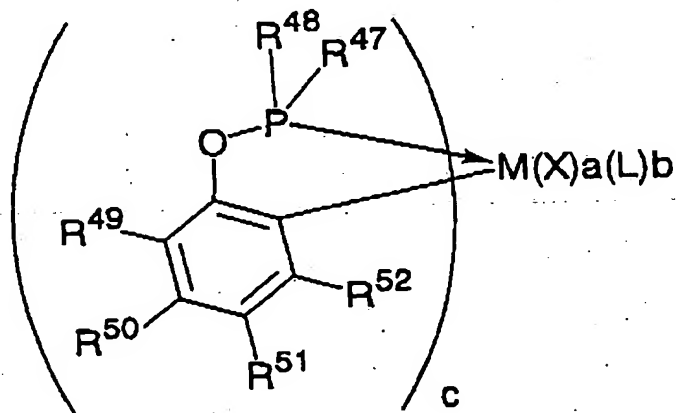
12. A catalyst for polymerization of an olefin, which comprises (A) a transition metal compound and (B) an activating cocatalyst; said transition metal compound (A) being represented by the following general formula (13):



wherein  $R^{43}$  through  $R^{46}$  represent a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, a halogen atom, or a substituent containing an atom of group 15 or group 16 of the periodic table, and  $R^{43}$  through  $R^{46}$  may be the same or different;

$Y$ ,  $M$ ,  $X$ ,  $L$ ,  $a$ ,  $b$  and  $c$  are the same as  $Y$ ,  $M$ ,  $X$ ,  $L$ ,  $a$ ,  $b$  and  $c$ , respectively, which are defined for formula (1); and two members selected from  $Y$  and  $R^{43}$  through  $R^{46}$  may be bonded together to form a ring, provided that at least two rings can be formed;  $X$  and  $L$  may be bonded to each other,  $L$  and  $R^{46}$  may be bonded to each other, and  $L$  and  $Y$  may be bonded to each other.

13. A catalyst for polymerization of an olefin, which comprises (A) a transition metal compound and (B) an activating cocatalyst; said transition metal compound (A) being represented by the following general formula (14):



wherein  $R^{47}$  through  $R^{52}$  represent a hydrogen atom, a hydrocarbon group having 1 to 20 carbon atoms, a substituted silyl group, a substituted amide group, a substituted alkoxy group, a substituted aryloxy group, a halogen atom, or a substituent containing an atom of group 15 or group 16 of the periodic table, and  $R^{47}$  through  $R^{52}$  may be the same or different;

M, X, L, a, b and c are the same as M, X, L, a, b and c, respectively, which are defined for formula (1); and two members selected from  $R^{47}$  through  $R^{52}$  may be bonded together to form a ring, provided that at least two rings can be formed; X and L may be bonded to each other, L and  $R^{47}$  may be bonded to each other, L and  $R^{48}$  may be bonded to each other, and L and  $R^{52}$  may be bonded to each other.

14. A catalyst for polymerization of an olefin, which comprises (A) a transition metal compound as claimed in any one of claims 1 to 7, (B) an activating cocatalyst, and (C) an organometallic compound.

15. A catalyst for polymerization of an olefin, which comprises a catalyst as claimed in any one of claims 9 to 13, and (C) an organometallic compound.

16. A process for polymerizing an olefin, which comprises polymerizing an olefin in the presence of a catalyst comprising (A) a transition metal compound as claimed in claim 1, and (B) an activating cocatalyst.

17. A process for polymerizing an olefin, which comprises polymerizing an olefin in the presence of a catalyst comprising (A) a transition metal compound as claimed in claim 1, (B) an activating cocatalyst, and (C) an organometallic compound.